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REPORT

ON THE WORKING OF THE

HARCOURT BUTLER INSTITUTE OF PUBLIC HEALTH, RANGOON

FOR THE YEAR 1935

RANGOON
SUPDT., GOVT. PRINTING AND STATIONERY, BURMA
1936

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RESOLUTION

ON THE

Report on the Working of the Harcourt Butler Institute of Public Health, Rangoon

For the year 1935.

Extract from the Proceedings of the Government of Burma, Education Department,—No. 270SJ36, dated the 2nd November 1936.

READ—

The Report on the Working of the Harcourt Butler Institute of Public Health, Rangoon, for the year 1935.

RESOLVED THAT—

The Report be published.

By order,

M. K. MIN,

Secretary to the Government of Burma,
Education Department.

REPORT

ON THE WORKING OF THE

Harcourt Butler Institute of Public Health, Rangoon

For the Year 1935.

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1. STAFF OF THE INSTITUTE—*Director.*—Mr. K. T. Jungalwalla, L.M. & S. (Bom.), F.R.F.P. & S. (Glas.), D.P.H., D.T.M. & H. (Cantab.).

Assistant Director.—Mr. G. Mackey, D.T.M., I.M.D., from 1st January to 1st March 1935.

Dr. K. P. Kundu, M.B. (Cal.), D.B. (Lond.), from 2nd March to 31st December 1935.

Malariologist.—Lieutenant E. S. Feegrade, D.T.M., K.-I-H., I.M.D., from 1st April to 9th April and from 10th June to 31st December 1935.

Public Analyst.—Post held in abeyance.

Assistant Chemist.—Mr. G. C. Moitra, B.Sc., F.C.S., from 2nd January to 23rd September and from 18th October to 31st December 1935.

Mr. T. R. Vedantham, B.Sc., from 24th September to 17th October 1935.

Assistant Malariologist.—Sub-Assistant Surgeon U Tin, D.T.M.

Assistant Bacteriologist.—Sub-Assistant Surgeon U Thaw Zan, from 1st January to 2nd April 1935.

Sub-Assistant Surgeon U Pa How, from 3rd April to 31st December 1935.

2. FUNCTIONS OF THE INSTITUTE.—The work of this Institute has been both of a routine and research nature. A heavy routine manufacture of prophylactic cholera vaccine was started in 1935. The ordinary routine work carried out in this Institute can be classified under—

(1) Public Health Laboratory work, both bacteriological and chemical ;

(2) Malaria investigations. Keeping of provincial malaria records. Breeding and distribution of larvivorous fish ;

(3) Examinations of rats for the presence of plague.

Particulars of the above will be found in separate reports written by the different sections.

In addition, the Institute is the training institution for Public Health Inspectors, for Health Visitors and L.M.P. students undergoing the course for the License in Hygiene.

Lectures and demonstrations on Hygiene and Public Health are also given in the Institute to the students of the M.B., B.S. class of the Rangoon University and to the students of the Burma Medical School.

The course for training of Public Health Inspectors was closed as a temporary measure during the year under report.

Other activities of the Institute are—

(*a*) The storage and issue of plague, cholera and influenza vaccines ;

(*b*) The preparation of exhibits for the technical section of the Annual Health Exhibition ;

(*c*) The storage of Red Cross exhibits in connection with Public Health propaganda work ;

(*d*) The giving of cinema shows and demonstrations on Public Health matters to the public ;

(*e*) Lastly the Institute provides a suitable meeting place for associations connected with health, such as the Red Cross Society, the St. John's Ambulance Association, etc.

The following table shows the issues of prophylactic vaccines during the year :—

Vaccine.	Number of requisitions complied with.	Number of doses issued.
Plague	266	132,968
Cholera	643	579,677
Influenza	5	800

The following cinema shows and demonstrations were given at the Institute during the year :—

Date.	Attended by	Title of Film.
5-3-35 ...	Students of the Burma Health School.	(1) Respiration. (2) Reproduction.
6-3-35 ...	Do.	(1) Heart. (2) Circulation.
9-3-35 ...	Do.	(1) Digestion. (2) Respiration.
5-6-35 ...	Do.	(1) Hookworm. (2) The Village Well.
12-6-35 ...	Do.	(1) Lantern slides on "Small-pox." (2) Safety First.
1-7-35 ...	Monday Afternoon Club ...	(1) Fly Danger. (2) Lantern slides on "Consumption."
4-7-35 ...	Students of the Burma Health School.	(1) The War on Mosquitoes. (2) Malaria. (3) Lantern slides on "Tubercle bacilli."
27-8-35 ...	Do.	(1) Fly Danger. (2) Public Health Twins at work. (3) Lantern slides on "Flies."
28-8-35 ...	Do.	(1) Lantern slides on "Plague" and "Infant Welfare." (2) The Might of Pure Milk. (3) Mother's milk best for babies.
20-12-35 ...	Medical Profession and Officers of the Public Health Department.	(1) Prevention of blindness and saving of the eyes.

At Christmas, the Institute received from Sir Spencer Harcourt Butler, G.C.I.E., K.C.S.I., I.C.S., whose name the Institute bears, a very fine portrait of himself and an encouraging letter conveying his good wishes.

A tea party was arranged on the 22nd November 1935 on the grounds of this Institute, by the Burma Branch of the Indian Red Cross Society, in honour of Dr. Ruth Young, Director of the Maternity and Child Welfare Bureau, Indian Red Cross Society. Dr. Young visited Burma as external examiner for the Burma Health School examination, and also did a tour of inspection of the Child Welfare centres in the Province.

3. VISITORS.—The following distinguished persons visited the Institute during the year :—

The Hon'ble Minister for Education, Local Government and Public Health and Mrs. Ba Maw.

Dr. De Sa, M.D., F.C.P.S.

Dr. R. N. Copper, M.S., F.R.C.S., F.C.P.S.

Lieutenant-Colonel G. T. Burke, M.D., F.R.C.P., I.M.S., Secretary of the Indian Medical Council.

Professor D. B. Blacklock, M.D., D.P.H., D.T.M., Liverpool School of Tropical Medicine and Mrs. Blacklock.

Dr. Ruth Young, M.B.E., W.M.S., Director of the Maternity and Child Welfare Bureau, Indian Red Cross Society, New Delhi.

Dr. C. C. Turner, Dr. P.H., F.A.P.H.A., Chairman of the Health Section of the World Federation of Education Associations.

Report of the Bacteriologist, Dr. K. P. Kundu, M.B. (Cal.), D.B. (Lond.), on the Bacteriological section for the year 1935.

4. This section consists of three sub-sections :—

Bacteriological laboratory proper,
Media making room, and
Plague laboratory.

5. *Bacteriological Section*.—ROUTINE WORK.—Routine work principally consisted of—

Bacteriological examination of water for the determination of its potability, and the examination of water for the presence of cholera vibrio.

Examinations for the Customs Department of shaving brushes for the presence of anthrax bacillus.

Finding the carbolic acid co-efficient of disinfectants.

Preparation of bacterial emulsions for agglutination tests.

Preparation of high titre agglutinating sera.

Maintenance of stock cultures of bacteria.

Preparation of cholera vaccine.

Examination of rats.
Stocking and looking after animals.

Bacteriological examination of water for the determination of its potability consisted in (*a*) determining the total number of aerobic bacteria per cubic centimetre of water, (*b*) the least quantity fermenting McConkey bile salt lactose broth, (*c*) presence or absence of Cl. welchii in 20 c.c. of water, (*d*) identification according to Clemesha's classification of those lactose fermenting organisms found present. The last test is done only in the case of a water showing the presence of lactose fermenters in less than 50 c.c. The examination of the majority of the samples of water according to the above requirements takes about eight days for completion. The table below shows the number of water samples examined during the year and their sources.

TABLE.

PUBLIC WATER SAMPLES.

Hlawga Lake, chlorinated (Rangoon Corporation) ...	55
Hlawga Lake, unchlorinated (Rangoon Corporation) ...	54
Samples of tube well water sent by the Water Officer ...	33
Bassein	25
Maymyo	26
Moulmein	17
Pyinmana	12
Port Health Officer, Rangoon	15
Insein	11
Pyawbwè	11
Magwe	10
Mandalay	9
Pegu	8
Rangoon Jail	9
Port Blair	9
Others	58
Waters for Vibrio choleræ.	
Numbers of samples	8
Total ...	370

Two samples of Hlawga Lake water are examined weekly, while samples were sent monthly for examination from the following places :—

Maymyo.	Bassein.
Pyinmana.	Moulmein.

Water samples from newly bored tube wells are bacteriologically examined before a permanent licence can be granted under the provisions of the Burma Underground Water Act, and thirty-three such samples were received during the year.

Eight samples of water were sent to be examined for the presence of cholera vibrio. All were negative except one sample, from which an organism simulating the cholera vibrio was isolated, but it did not agglutinate with stock high titre serum.

Twenty-one samples of shaving brushes of different manufacture were sent by the Customs Department to be examined for the presence of anthrax bacillus ; on no occasion was this organism found.

Four samples of disinfectants were tested for their carbolic acid coefficient. Out of these, three samples were received from the Police Supplies Depôt, Rangoon. It must be noted here that this examination gives only a comparative result, as it is not possible to maintain standard requirements for the Rideal Walker test in this laboratory at present.

Bacterial emulsions of the typhoid and paratyphoid group of organisms were prepared in accordance with instructions detailed in the Medical Council Research Series No. 51.

Preparation of high titre agglutinating sera was started for the first time in this laboratory this year. In previous years, such sera had to be purchased from the Pasteur Institute of Burma.

The following stock cultures were maintained in this laboratory during the year :—

1. B. typhosus.
2. B. paratyphosus A.
3. B. paratyphosus B.
4. B. coli.
5. B. dysentery Flexner.
6. B. dysentery Shiga.
7. B. pestis.
8. Staphylococcus.
9. Vibrio choleræ (ten strains).
10. Ratin virus.
11. Ratin 116.
12. Ratin 688.
13. Liverpool virus.
14. Danyz's virus.
15. Ps pyocyaneus.
16. Ch. prodigiosus.

6. Preparation of Cholera Vaccine.—This has turned out to be the heaviest item in the list of duties of this laboratory. As this laboratory did not possess the necessary apparatus, preliminary experiments and the manufacture of the vaccine on a small scale were started with the help of the Pasteur Institute of Burma, and the thanks of the writer are due to the Director of that Institute for his co-operation. Large scale preparation of the vaccine was started in the Harcourt Butler Institute from the month of September when the laboratory was equipped with the necessary apparatus.

During the year, about 80,000 doses of this vaccine were prepared, out of which 20,000 doses, approximately, were filled in ampoules and issued. The manufacture of this vaccine in the Institute means a large saving to the Local Government.

METHOD OF PREPARATION. (Short synopsis).—Strains of cholera vibrios used in the preparation of cholera vaccine are isolated from acute cases of cholera. They are highly agglutinable against stock "H" and "O" high titre sera. These strains are stocked in agar amedi (pH 7·6) and are passed through guinea-pigs at intervals of 6 to 8 weeks to maintain their virulence.

The seed cultures are always tested for Millon stability before bottles are planted with them. The washing from each bottle is poured in separate test tubes and is tested for bacterial purity by streaking agar slopes with a trace of emulsion.

The purity tests are passed at the end of 48 hours and the washings are collected in a flask after decanting the supernatant fluid. The strength of the emulsion is estimated by the opacity method. The vaccine is now carbolised. The sterility test is done both aerobically and anaerobically 24 hours after the addition of carbolic acid. If found sterile, about half a c.c. of the bulk vaccine is then injected subcutaneously into a guinea-pig, which is examined every day for a week for evidence of any necrosis. If there be no necrosis, the vaccine is ready for dilution and storage in a cold room until required. The date of manufacture of the vaccine starts from the date of dilution. Each c.c. of the diluted vaccine contains approximately 8,000 millions of the cholera vibrio per c.c. Soon after the dilution, a sterility test is done again and, when passed, the vaccine is filled in 10 c.c. ampoules with the help of a Geryk vacuumatic machine. When the ampoules are sealed, a few of these are selected at random and tested for sterility both aerobically and anaerobically.

7. *Media Section.*—The work in this section increased considerably. The increase was mainly due to the additional routine work of the manufacture of cholera vaccine. There have been a number of changes in the method of preparation of media used in this laboratory, of which the outstanding one is the preparation of papain digest broth. This has taken the place of the ordinary meat infusion broth and the yield is about four times greater than that obtained by the former method. It was also found economical to replace agar powder with china grass in the preparation of solid media.

Approximately 15 varieties of media are being prepared in this section, of which Levinthal blood agar media is an addition worth mentioning. Staining solutions and chemical reagents necessary for routine bacteriological tests are also prepared by this section. It should, however, be noted that the preparation of reagents that require high technical skill, *viz.*, normal solutions and Millon's reagent, is undertaken by the Chemical Department of this Institute.

8. *Plague Section.*—As in previous years, the Port Health Department continued sending trapped rats daily from the Port Area. Dead and live rats were also sent to this section from steamships. Every one of

these rats was identified, dissected, and smears made from spleens were examined for the presence of Pr. pestis with negative results in every instance.

The following table shows the numbers of the different species of rats sent during the year under report :—

TABLE I.

LIVE RATS (PORT AREA) BY SPECIES EXAMINED.

N. bengalensis	874
M. concolor	400
C. coerulea	171
M. musculus	154
R. rattus	132
R. norvegicus	89
Total ...	1,820

TABLE II.

LIVE RATS (STEAMSHIPS) BY SPECIES EXAMINED.

R. rattus	111
M. musculus	26
M. concolor	2
R. norvegicus	1
N. bengalensis	Nil
C. coerulea	Nil
Total ...	140

TABLE III.

DEAD RATS (STEAMSHIPS) BY SPECIES EXAMINED.

M. musculus	285
R. rattus	48
R. norvegicus	8
M. concolor	1
C. coerulea	1
N. bengalensis	Nil
Total ...	343

9. *Field Laboratory Work.*—An investigation was undertaken in connection with a sudden outbreak of a fatal infectious pneumonia at Thinbangone Village in the Tharrawaddy District during October. The bacteriologist of this Institute was called to the place and he reached it just in time to examine a dying patient. Microscopical, cultural and animal tests all showed the presence of Pr. pestis. Such outbreaks of pneumonic plague are extremely rare in Burma.

10. *Laboratory Animals.*—An important part of the routine work was that of looking after the animals which were stocked for use in experiments, and also those that were actually under experiment. On

more than one occasion an epizootic started. Such outbreaks were successfully stopped at the outset. During the year under review, 40 guinea-pigs and 3 rabbits were used for experimental purposes. Our thanks are due to the Superintendent of the Victoria Memorial Park, Zoological Gardens, Rangoon, and the Director, Vaccine Depôt, Meiktila, for kindly supplying us with animals at a time when our stock ran short.

11. *Research.*—(i) Experiments with rat killing viruses :—

The following strains were used :—

(*a*) Ratin.
(*b*) Ratin 688.
(*c*) Ratin 116.
(*d*) Danyz's virus.
(*e*) Liverpool virus.

With a view to finding out if any of the above strains could produce an epizootic among rats, with a mortality high enough to recommend such viruses as efficient rat exterminators, different sets of experiments were carried out with each of the above strains.

The common Burmese house rat, Mus concolor, was used in every experiment. The experiments were conducted on the following lines. The strains were first passed through successive rats by intraperitoneal injection to increase their virulence to the stage when the rats died invariably within 24 hours. Feeding experiments were then carried out. About one c.c. of 24 hours agar culture emulsion of this virulent strain was mixed with a small quantity of cooked rice and put in the cage of the rat under experiment. In most cases the infected food was eaten within an hour. With a few exceptions, the fed rats died within six days and the organism could be recovered from the abdominal viscera. The next step in the experiment was to put a fed rat in another cage containing 6 to 8 healthy rats, which had been kept under observation for about a week previously. In spite of such intimate contact, we failed to start an epizootic in every experiment carried out. All these experimental rats fed from the same container. The rats were observed for about 5 weeks, and in some cases breeding took place during the period under experiment. The fed rats were marked by their ears being snipped. From these experiments it would appear that Ratin virus is not superior to ordinary rat poisons as the fed rat only dies and that also not within 4 days. If the viruses had started an epizootic with a high mortality among rats they would have been excellent rat exterminators, though objections to their use for rat destruction in public health activities inside domestic premises or food warehouses would have been encountered, as it has not yet been definitely proved that these viruses are not communicable to human beings.

(ii) During the course of the bacteriological examination of waters this year, B. 98 (citrate + ; indol − ; V.P. +) was found in 32 out of 362 samples of water. Out of these 32 samples, 20 samples were collected from sources where the writer was able to assure himself that human faecal contamination was so remote a possibility as to be negligible. It was also found that this organism, in the majority of the cases, was associated with other organisms which were citrate utilisers, non-producers of indol and V.P. positive. In only 12 cases were faecal organisms (citrate − ; indol +) found associated with this organism. Clemesha in his book, " The Bacteriology of Surface Waters in the Tropics " doubts its faecal origin and mentions that this organism was isolated on some occasions from comparatively good samples of water. He, however, put this organism into Class I, so that its presence would make one suspicious of faecal pollution at the source. From all the work done on water bacteriology, so far, the conclusion that can be drawn is that true faecal organisms should be citrate non-utilisers, indol producers and V.P. negative, whereas those of the non-faecal origin are citrate utilisers, non-producers of indol and V.P. positive.

An effort was made in this laboratory to find out the incidence of B. 98 in human faeces. Twenty-five lactose fermenting colonies from different samples of stools were examined and only on two occasions was B. 98 encountered. In one case the stool was mixed with water. It was interesting to note that, out of these 25 organisms examined, 21 were citrate non-utilisers, indol producers and V.P. negative. Of the other two citrate utilisers, one was B. 7 and the other was unclassified.

The next test that was done with B. 98 was to find its resistance to sunlight. Clemesha's Class I organisms do not live in water for a long time when exposed to sunlight. Two sets of flasks, one containing sterilised distilled water and another containing sterilised pond water were inoculated with saline emulsion of 24 hours agar culture of B. 98. The mouths of the flasks were covered with pieces of gauze and the flasks were exposed to sunlight for 37 days. The samples of water were tested at frequent intervals and B. 98 was recovered on every occasion. These experiments show that B. 98 is resistant to sunlight. Lastly, it should be pointed out that B. 98 was found 19 times from March to May, while it was found 8 times only during the months of July and August. This is not in keeping with the findings of Clemesha who mentioned that it is never found in water supplies in dry and hot weather.

12. *Instruction.*—Lectures and demonstrations were given to students of the License in Hygiene Class, Health Visitors and to the students of the Medical College and Medical School.

The following subjects were taught :—

Public Health laboratory practice ;
Plague and its preventive measures ;
Identification of rats and rat fleas ;
Demonstrations on the working of the cyanogas pump.

13. *Miscellaneous Activities.*—This section took part in the Annual Public Health Exhibition, entirely supervising the sections on water bacteriology and the prevention of plague.

In July, a test was carried out in this Institute as to the efficiency of different types of cyanogas pumps. An elaborate experiment was done under the supervision of Mr. V. W. Fenn, with whom the plague section of this department fully co-operated.

Identification of snakes, whether poisonous or non-poisonous, is another minor part of the duties undertaken by this department.

Report of the Malariologist, Lieutenant E. S. Feegrade, I.M.D., on the Malaria Bureau for the year 1935.

14. During the year under review the following routine work was carried out :—

A. *Educational Instruction.*—(*a*) From the 19th July to 29th October instruction in malariology was given to the members of the License in Hygiene Class.

(*b*) A short course of instruction based on museum exhibits was given to the Health Visitors' Class.

(*c*) Two demonstrations were given to the students of the Burma Government Medical School.

(*d*) The Public Health Inspector of Lashio was given a comprehensive course on the identification of anophelines, and on methods used in combating breeding.

B. *Identification of Culicidae.*—Specimens of adults and larvae were received from the various districts in the province. They were identified and a report submitted to the sender. Three hundred and seventy-four adult anophelines and 2,510 anopheline larvae were thus identified. Similarly, 39 adult culicines and 2,650 culicine larvae were dealt with. Amongst the anophelines sent for identification, three varieties hitherto not recognized were added to the list of anophelines found in Burma, *viz.*—

Species.	*Locality.*
1. A. gigas var. simlensis—James 1911 ...	... Lashio, Northern Shan States.
2. A. barbirostris var. ahomi—Chowdury 1929 ...	... Maymyo, Mandalay District.
3. A. aitkeni var. bengalensis—Puri 1929 ...	... Maymyo, Mandalay District.

C. *Spleen Census.*—Findings were received from 57 towns and 147 villages located in 29 districts of the province. The records are card-indexed so that they are readily available for reference. The rates noted vary from nil per cent in certain places in the dry zone to 100 per cent in the foothills and irrigated tracts. Spleen rate records are now being charted on sectional district maps, and on a large scale map of Burma.

D. *Blood Smears.*—One hundred and thirteen blood smears were examined during the year. These were obtained from selected places to ascertain the distribution of the species of parasites and to confirm reports.

E. *Special Weekly Reports.*—These are received from Kyaukpyu, Maymyo and Lashio, as in these three areas anti-malarial measures are carried out under special supervision.

KYAUKPYU.—Satisfactory progress continues to be made in dealing with A. annularis, the chief carrier in the past. A. sundaicus, which in previous years was confined to one area, now shows a tendency to invade other parts of the town. It has not yet been definitely incriminated as a carrier but investigation of this point is in hand; active steps are being taken to reduce breeding and, as well, a study is being made on the salinity of its breeding places.

MAYMYO.—Anti-malarial work here continues to be prosecuted vigorously and, judging by the reduction in the number of larvae caught in known breeding places, is being attended with a fair measure of success.

During the year, A. annularis was observed to have changed its breeding habits as it is now found in large numbers in hoof prints. A. minimus and A. culicifacies continue to act as carriers in this town.

LASHIO.—The number of breeding places is being slowly but steadily decreased. Stone filling is being practised and dense shading is being attempted.

A. maculatus and A. minimus are the carriers of malaria in this area.

F. *Preservation of Specimens.*—(*a*) Specimens of all phases of the common insects of medical interest are mounted both for teaching purposes and for the museum. Specimens of larvivorous fish that are used in Burma are also mounted.

(*b*) A new scheme for breeding these fish has been evolved and, it is hoped, will be shortly put into use. It is anticipated that under the new method it will be possible to supply malarious areas throughout the Province with these fish in effective numbers.

The fish being bred are—

(1) Gambusia affinis.
(2) Panchax panchax.
(3) Esomus ahli.

Of these, the greatest success has attended the breeding of Gambusia affinis. From 1,577 fish, 5,455 were bred during the year; casualties amounted to 1,863. They were distributed to—

Pyapôn	1,700
Hlègu	1,000
Hanthawaddy...	800
Maymyo	320
Rangoon	195
Sahmaw	150
Lashio	107

Reports received from these places indicate that breeding appears to be proceeding satisfactorily.

Specimens of fish were received for identification from the districts. In cases of doubt they were forwarded to the Director, Zoological Survey of India, Calcutta.

A new species of fish was discovered and sent to the Zoologica Survey of India, Calcutta. It has been named Dermogenys burmanicus.

15. *Special Investigations.*—(1) A spleen census was carried out in Maymyo and seven adjoining villages between the 7th and the 24th August. The total rate was 0·74 as compared with 1·59 in 1933. (2) In Rangoon, special inspections were made with a view to ascertaining breeding places of mosquitoes at the Government Printing Press, in Windermere Park area, and in 46th Street. In each case, recommendations were made as to how to check breeding. (3) *Proprietary Preparations.*—Three of these were experimented with during the year, namely, (*a*) Pearson's larvicide, a product of Messrs. The Pearson Anti-Septic Co., Ltd., 172, Buckingham Palace Road, London, (*b*) "Britway" Paris Green, samples of which were obtained from Messrs. The Imperial Chemical Industries (India), Ltd., No. 508, Merchant Street, Rangoon, and (*c*) Tic, a sample of which was obtained from Messrs. The Havero Trading Co., Ltd., Ballard Estate, Bombay. The results are recorded in the Bureau.

16. *Miscellaneous Activities.*—Health Week of the Indian Red Cross Society, Burma Provincial Branch.

During the year two Health Exhibitions were held, one in January and one in December. In this connection the Bureau undertook a large amount of work in the way of turning out posters on health subjects and manufacturing models. Supervision was exercised over the manufacture of similar posters and models for the Rangoon Corporation, who employed, under the direction of the Malaria Bureau, the necessary artists and carpenters.

In this connection, it is gratifying to note that the January Exhibition was awarded the Bostock Hill Memorial Shield by the Royal Sanitary Institute, London.

17. *Departmental Publications.*—A note was written on how to breed Gambusia affinis and another on the use of Paris green. These were circulated to officers of the Public Health Department.

Report of work done in the Chemical Section for the year 1935.

18. Seven hundred and fifty-three samples were examined during the year under review. The samples were made up as follows :—

Miscellaneous foods and drugs	425
Waters	300
Effluents	28
Total ...	753

The examinations were undertaken for the following public bodies and individuals :—

Public Health Department.	Jails.
Public Works Department.	Civil Surgeons.
Municipalities.	Rangoon Port Trust.
District Councils.	Burma Railways.
Hospitals.	Private firms and individuals.

19. *General.*—This year a total of 425 samples of miscellaneous foods and drugs was examined as against 280 samples in the previous year. This increase is largely due to the increased number of samples received from the Port Health Department.

A statement showing details of the miscellaneous foods and drugs examined is appended.

MUSTARD OIL.—Thirty-seven samples of mustard oil were received from the Health Officer, Corporation of Rangoon, for detection of adulterants in connection with the investigation of an outbreak of epidemic dropsy in Rangoon. On examination, 26 samples were found more or less adulterated with either sesamum oil or ground-nut oil or both. Thirty-five samples were received from the Port Health Department, and 9 were found adulterated.

GHEE.—Of 148 samples of ghee received from the Port Health Officer, Rangoon, three were found to consist entirely of vegetable fat and two others contained only 8 and 15 per cent respectively of genuine ghee.

20. *Lectures*—BURMA HEALTH SCHOOL.—Sixteen lectures in elementary physics and chemistry were given to the students of the Burma Health School.

LICENSE IN HYGIENE COURSE.—Weekly practical classes were held extending over a period of six months for training the students of the License in Hygiene Course in the routine analysis of water, fresh milk, condensed milk, rice and ghee.

MEDICAL SCHOOL AND MEDICAL COLLEGE.—A few lectures and demonstrations were given to the students of the third year of the Medical School and the fourth year of the Medical College on the routine analysis of water and milk.

21. *Examinations.*—Examinations in physics and chemistry, both written and oral, were held for the students of the Burma Health School on completion of the course of lectures.

The students of the License in Hygiene class were also examined in practical chemistry on completion of their course of training.

22. *Other Activities.*—The annual Health Exhibition is one of the activities of this department, which is responsible for the technical food and water stalls.

Detailed Statement of the various Foods and Drugs examined during the year ending 31st December 1935.

Description of Samples.	Number examined.	Number adulterated or otherwise unsatisfactory.	Percentage of adulteration.
Atta	12	...	...
Broth	8	...	...
Coffee	5	1	20·0
Dhal	10	...	...
Flour	4	...	...
Ghee	159	28	17·6
Milk, fresh	36	24	66·7
Milk, human	4	...	...
Milk, condensed	2	...	...
Oil, mustard	72	35	48·6
Perchloron	1	...	...
Phenol	1	...	...
Rice	56	10	17·9
Rice bran	32	...	...
Suet	1	...	...
Tea	1	1	100·0
Tablets, cinchona febrifuge	12	...	...
Tablets, quinine	7	4	57·1
Tablets, cholera	1	...	...
Tablets, eye	1	...	...
Total ...	425	103	...

G B C.P.O.—No. 74, D.P.H., 20-11-36—240.